

The Invasion

by Berys Spratt



I Feel Sick!

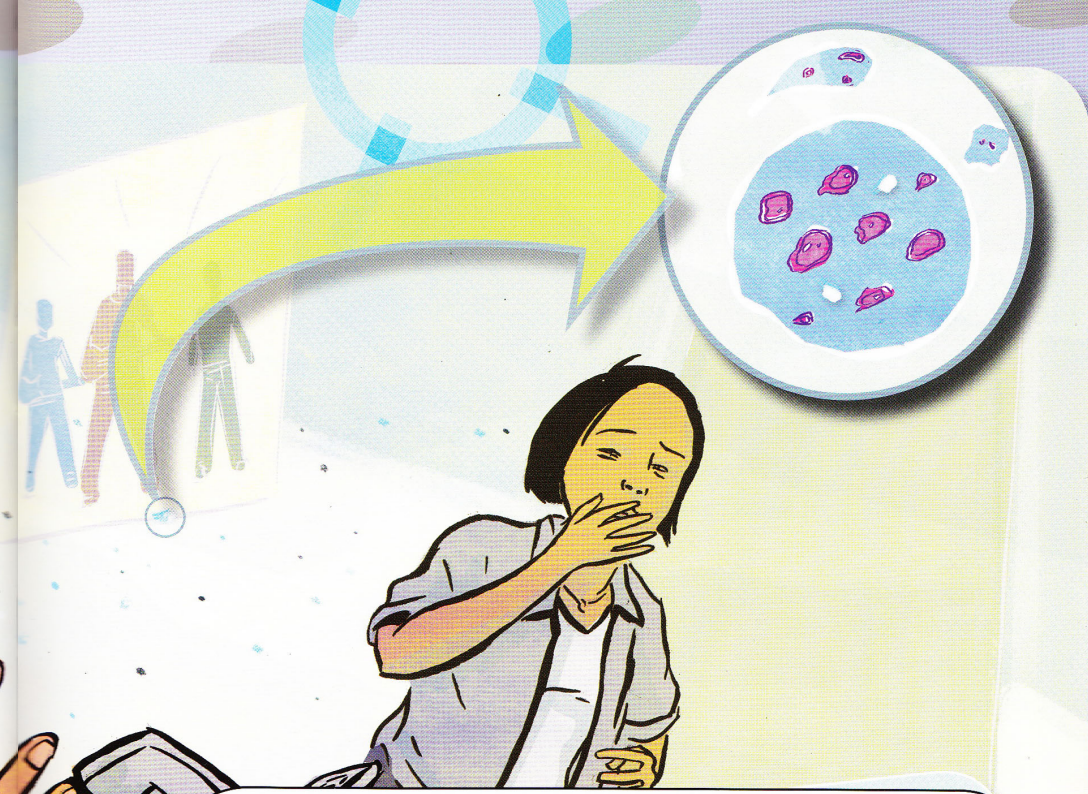
It's the start of the holidays. The weather's great. Your friends have been texting. And you're stuck in bed with a headache, fever, and blistery rash! So what went wrong and spoiled your plans?

About two weeks before you started feeling sick, the varicella zoster virus managed to get inside your body. You probably know this virus as chickenpox. Doctors call it VZV. Where did you get it from? From someone else who had the virus.



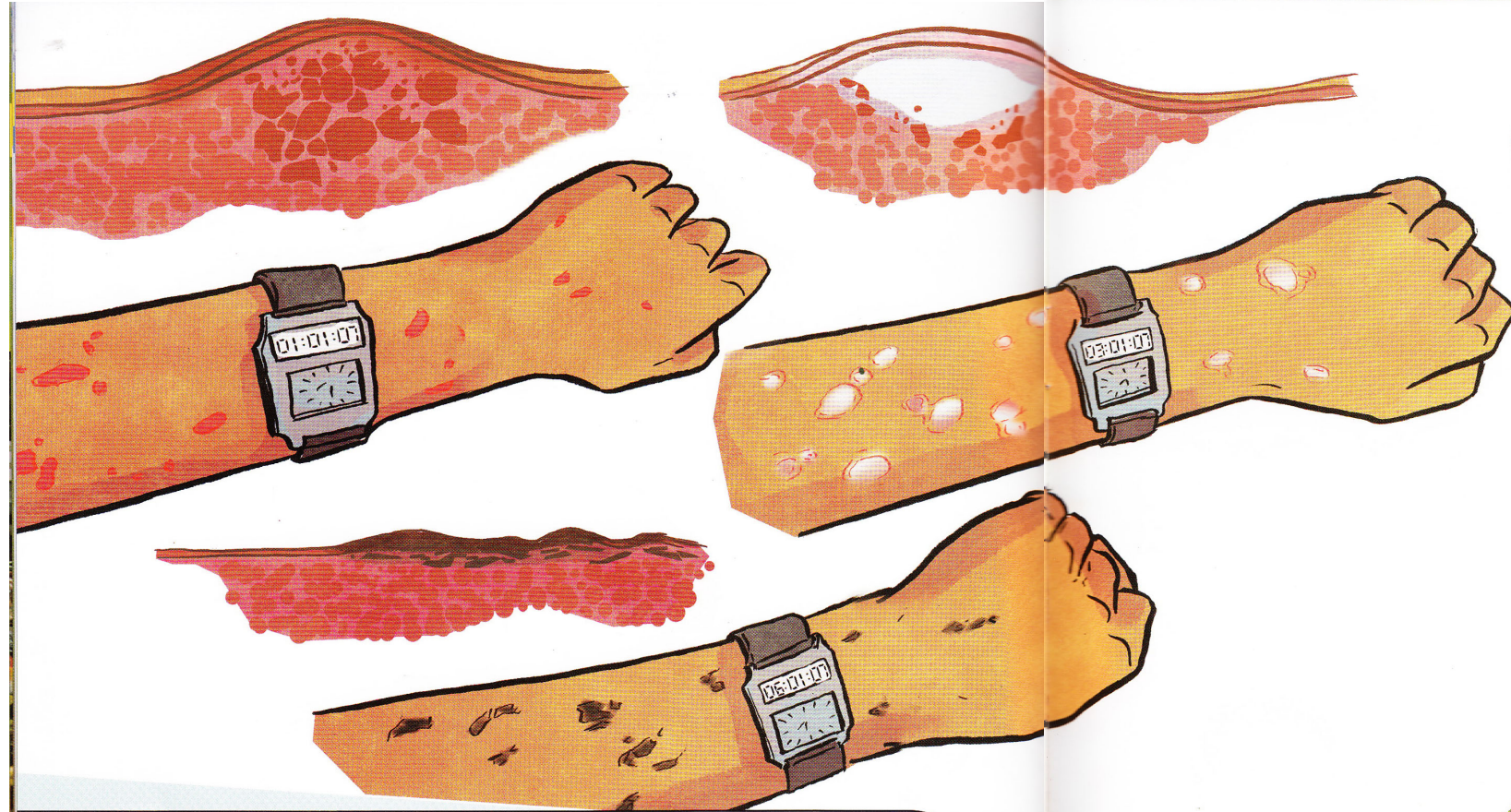
So how did it get from them to you? Chickenpox is easily passed on by touch — but it's not too likely that you caught it by touching someone's weeping blisters. Perhaps you touched something that they had touched, but airborne droplets of mucus and saliva were probably to blame. Every time someone coughs or sneezes, the air becomes full of microbes.

In fact, a single sneeze can spray 6 million viruses into the air. Just a few VZV-containing droplets up your nose, in your mouth, or on your skin, and Zap! You were infected. Once the virus was inside you, it got down to business. For a virus, there's only one kind of business — reproducing.



Many diseases enter the body through the cells that line your nose and windpipe. And that's probably where your VZV infection started. Cell after cell was attacked, turned into a VZV factory, and blasted apart — releasing its stockpile of freshly made viruses. Eventually millions of viruses found their way into your bloodstream. They began whizzing around. They were looking for their favourite host cells — which are in your skin.

For two or three weeks, you had no idea that anything was wrong. At the end of this "incubation period", you were still looking normal — but, with a headache and raised temperature, you'd begun to feel sick. Not only that, but you'd become a bit dangerous to know. Before you had symptoms, you couldn't pass the virus on. But that changed when you started feeling sick. At that point, you became infectious.



Over the following days, you looked sicker and sicker. The virus had infected your skin cells. Now it was causing an itchy rash of small, red spots. They began on your stomach and face. Then they spread to your scalp and limbs. You hated the way you looked with that rash, but the VZV had one more surprise — blisters! As the virus attacked your skin cells, they swelled and burst. Your red spots rose up into little balloons of fluid from all those burst cells. Then pop, pop, pop. The blisters burst — and now you have scabs to look forward to.

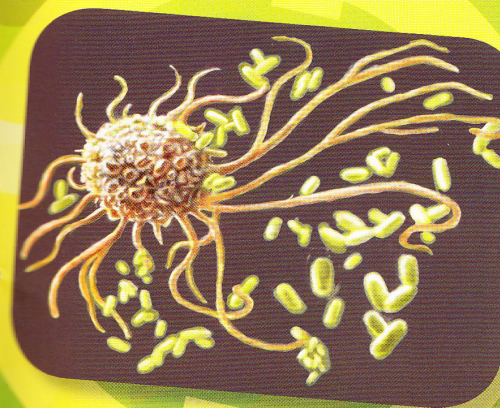
But, believe it or not, the blisters are a good sign! The end is near for the VZV because as soon as the virus entered your body, your **immune system** swung into action.

The Battle Within

The immune system rids your body of invaders. It leaves the good microbes alone, but it attacks harmful bacteria and viruses. It also attacks body parts it doesn't recognise — for example, injected blood from a person with a different blood group, or a transplanted organ. (If you receive a transplanted organ, doctors give you very powerful drugs to stop your immune system from attacking it.)

So how does your immune system do its work? It makes special blood cells. You've probably heard people talk about "red blood cells", which carry oxygen, and "white blood cells", which fight disease. Doctors call the white blood cells **leucocytes**. There are many types, including **neutrophils** and **macrophages**.

When the VZV entered your body, neutrophils and macrophages headed straight for the trouble spot. The word macrophage, which means "big eater", gives you a good idea what they do. As shown at the left, macrophages and neutrophils gobble up microbes and store them inside themselves. Then they zap the trapped microbes with chemicals to kill them.



Neutrophils have a short life. Once they enter infected tissue, they live only one or two days — but they manage to kill ten to twenty microbes in that time. There's just one problem. The chemicals that kill the microbes soon kill the neutrophil itself. The pus inside your chickenpox blisters is full of dead neutrophils. Luckily, your bone marrow makes new ones 24/7. The neutrophil at the right is moving out from the bone marrow where it was made.

Macrophages arrive a little later than the neutrophils, and they live much longer — up to two years, in fact. Macrophages have another special job. They're real telltales. They immediately raise the alarm — and waves of B-cells, killer T-cells, and other defenders flood to the infected site.

Meanwhile, Back in Your Sickbed

Thanks to your amazing immune system, things are looking up. Those scabs will soon drop off, and you're starting to feel much better. And the best thing of all? You'll never get chickenpox again. Your leucocytes have great memories. If VZV enters your body again, they'll know exactly what they're dealing with and kill it instantly. Congratulations. You've become immune.

